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WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402-3319

EXAMINER	
VATHYAM, SUREKHA	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/607,856	SHUK ET AL.	
	Examiner	Art Unit	
	Surekha Vathyam	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-12 and 23-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-12 and 23-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/4/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1 – 6 and 8 – 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. These claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Independent claim 1 recites the new limitations, "and separates the first RTD from the exhaust stream" (lines 14 – 15 of claim 1) and "and separates the second RTD from the exhaust stream" (lines 18 – 19 of claim 1) in relation to a first cover and second cover, respectively. The specification as originally filed does not provide support for these new claim limitations. The specification on page 10, lines 4 – 8 states, "The reference and the catalyst RTD's are exposed to the exhaust stream" and further on page 13, lines 6 – 10 states, "The two RTD elements 34 and 36 are preferably placed in similar flow regions in the measured gas". These statements would not convey to one of ordinary skill in the art that the first cover and second cover "separate" the respective first and second RTD's from the exhaust stream. Page 13, lines 20 – 26 of the specification states, "Both the catalytic RTD and the reference RTD are thermally isolated from each other", which again does

not convey to one of ordinary skill in the art that the first and second covers separate the respective RTD's from the exhaust stream.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1 – 6 and 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828).

Regarding claim 1, Sheridan discloses a process analytic system (12) comprising: a device (38) for sensing a concentration of a combustible species of interest (column 7, lines 12 – 14) – in an exhaust stream (column 5, lines 42 – 49); a controller (18) coupled to the device and configured to receive measurements of the concentration of the combustible species (column 9, lines 66 – column 10, line 5 and column 11, lines 7 – 10); and a blowback system (column 8, lines 64 – 66) coupled to the device (38) and the controller (18) (column 10, lines 8 – 13), the blowback system being configured to responsively reverse gas flow through the device (column 8, line 66 – column 9, line 9). Sheridan also discloses the device to be a catalytic heat-flux sensor that measures differential changes in temperature (column 9, lines 60 – 62) but does not explicitly disclose the details of the device.

Dalla Betta ('828) discloses the device (see Figs. 1 – 4 and 6) comprises: a holder (626); a first RTD (114) disposed in a first protective cover (110), wherein the first cover (110) is metallic (column 5, lines 49 – 60, column 14, lines 28 – 37 and column 15, lines 4 – 16) and is mounted to the holder (626 via 110) and separates the first RTD from the exhaust stream (see fig. 1 wherein the RTD (114) is attached to the cover (110) which separates it from the exhaust stream and also see baffle/shield (118) (column 4, lines 33 – 38 and column 7, lines 10 – 13)); a second RTD (124) disposed in

a second protective cover (122), wherein the second cover (122) is metallic (column 5, lines 49 – 60, column 7, lines 49 – 51, column 14, lines 28 – 37 and column 15, lines 4 – 16) and is mounted to the holder (626 via 122) and separates the second RTD from the exhaust stream (see fig. 1 wherein the RTD (124) is attached to the cover (122) which separates it from the exhaust stream and also see baffle/shield (118) (column 4, lines 33 – 38 and column 7, lines 10 – 13)); and wherein the first cover (110) comprises a catalyst thereon which has a higher catalytic activity to the species of interest than the second cover (122) (column 4, lines 13 – 22 and column 7, lines 14 – 22). Specifically, column 15, lines 4 – 16 of Dalla Betta ('828) disclose the RTDs cemented to element blocks of alumina that are mounted in the stainless steel body so that ¾ inches was exposed.

It would have been obvious to one of ordinary skill in the art to have modified the system of Sheridan ('328) to include the device of Dalla Betta ('828) because as Dalla Betta ('828) explains the device provides the benefit of detecting low concentrations of nitrogen oxides with good accuracy in exhaust streams and the presence of other pollutants including sulfur does not substantially affect the accuracy (column 15, lines 56 – 61). Sheridan ('328) expressly states that sulfur is present in exhausts and could damage the sensors used to detect concentration of gas samples (column 1, line 67 – column 2, line 5).

Regarding claim 2, Dalla Betta ('828) discloses the first cover (110) is formed from a tube (see Fig. 1).

Regarding claim 3, Dalla Betta ('828) discloses the second cover (122) is formed as a tube (see Fig. 1).

Regarding claim 4, Dalla Betta ('828) discloses the catalyst (112) is disposed on the first cover (110) as a film (column 6, lines 36 - 40).

Regarding claim 5, Dalla Betta ('828) discloses the film is a Group VIII noble metal catalyst (column 6, lines 47 – 49 and column 6, line 66 – column 7, line 3).

Regarding claim 6, Dalla Betta ('828) discloses the film is constructed from a metal oxide combustion catalyst (column 6, lines 47 – 49 and column 6, line 66 – column 7, line 3).

Regarding claim 10, Dalla Betta ('828) discloses the second cover (122) is constructed from a catalyst-free (column 7, lines 14 – 18) stainless steel tube (column 15, line 4 – 16).

Regarding claim 11, Dalla Betta ('828) discloses at least one of the first (110) and second cover (122) is joined to the holder (626 via 110 and 122 respectively) using thermally insulative material (column 5, line 54 – column 6, line 11 and column 7, lines 49 – 51).

Regarding claim 12, Dalla Betta ('828) discloses the thermally insulative material is selected from the group of ceramic cement, adhesive, and high-temperature epoxy (column 5, line 54 – column 6, line 11 and column 7, lines 49 – 51).

7. Claims 1 – 6 and 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828) and further in view of McQueen (US 4,977,385).

While it is considered that claims 1 – 6 and 10 – 12 are obvious over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828) as explained above, McQueen (US 4,977,385) is relied upon as further evidence of obviousness.

Regarding claim 1, McQueen ('385) teaches an RTD (10) disposed in a protective cover (12) (see figs. 1 – 3 and column 9, lines 52 – 56), wherein the cover is metallic (column 9, line 56 – column 10, line 16) and separates the RTD from an exhaust stream (see figs. 1 – 3).

It would have been obvious to one of ordinary skill in the art to have modified the device of Dalla Betta ('828) in the system of Sheridan ('328) to include a metallic cover for the RTD as taught by McQueen ('385) because as explained by McQueen, the metallic cover will protect the RTD in hostile chemical or mechanical environment (column 9, lines 61 – 66).

Regarding claim 2, McQueen ('385) teaches the cover is formed from a tube (column 9, lines 56 – 61).

Regarding claim 3, McQueen ('385) teaches the cover is formed as a tube (see figs. 1 and 3 and column 5, lines 16 – 23).

Regarding claim 10, McQueen ('385) teaches the cover is constructed from a catalyst-free stainless steel tube (column 9, lines 56 – 61).

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828) as applied to claim 1 above, and further in view of Lauder (US 3,897,367).

Regarding claim 8, Sheridan ('328) in view of Dalla Betta ('828) does not explicitly disclose the catalyst comprises perovskite.

Lauder ('367) teaches a catalyst comprising perovskite (column 1, lines 5 – 8 and column 5, lines 61 – 63).

It would have been obvious to one of ordinary skill in the art to have modified the device of Dalla Betta ('828) in the system of Sheridan ('328) to substitute perovskite as the catalyst as taught by Lauder ('367) because as Lauder ('367) explains perovskite provides the benefit of stability and durability at high temperatures and has been shown to catalyze the oxidation of hydrocarbons and carbon monoxide (column 7, lines 4 – 17).

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828) and McQueen (US 4,977,385) as applied to claim 1 above, and further in view of Lauder (US 3,897,367).

Regarding claim 8, Sheridan ('328) in view of Dalla Betta ('828) and McQueen ('385) does not explicitly disclose the catalyst comprises perovskite.

Lauder ('367) teaches a catalyst comprising perovskite (column 1, lines 5 – 8 and column 5, lines 61 – 63).

It would have been obvious to one of ordinary skill in the art to have modified the device of Dalla Betta ('828) and McQueen ('385) in the system of Sheridan ('328) to substitute perovskite as the catalyst as taught by Lauder ('367) because as Lauder ('367) explains perovskite provides the benefit of stability and durability at high temperatures and has been shown to catalyze the oxidation of hydrocarbons and carbon monoxide (column 7, lines 4 – 17).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828) as applied to claim 1 above, and further in view of Valentine et al. (US 2,916,358).

Regarding claim 9, Sheridan ('328) in view of Dalla Betta ('828) does not explicitly disclose the catalyst comprises hopcalite.

Valentine ('358) teaches a catalyst comprising hopcalite (column 2, lines 23 – 28).

It would have been obvious to one of ordinary skill in the art to have modified the device of Dalla Betta ('828) in the system of Sheridan ('328) to substitute hopcalite as the catalyst as taught by Valentine ('358) because it causes the combustion of carbon monoxide and allows for its detection in a reliable and speedy manner (column 1, lines 15 – 30) as explained by Valentine ('358).

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheridan et al. (US 5,627,328) in view of Dalla Betta et al. (US 5,314,828) and McQueen (US 4,977,385) as applied to claim 1 above, and further in view of Valentine et al. (US 2,916,358).

Regarding claim 9, Sheridan ('328) in view of Dalla Betta ('828) and McQueen ('385) does not explicitly disclose the catalyst comprises hopcalite.

Valentine ('358) teaches a catalyst comprising hopcalite (column 2, lines 23 – 28).

It would have been obvious to one of ordinary skill in the art to have modified the device of Dalla Betta ('828) and McQueen ('385) in the system of Sheridan ('328) to substitute hopcalite as the catalyst as taught by Valentine ('358) because it causes the combustion of carbon monoxide and allows for its detection in a reliable and speedy manner (column 1, lines 15 – 30) as explained by Valentine ('358).

12. Claims 23 – 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isenberg (US 4,428,817) in view of Ruka et al. (US 5,021,304).

Regarding claim 23, Isenberg ('817) teaches a solid state device (9) for determining the concentration of oxygen in a gas phase (column 1, lines 8 – 11), the solid state device comprising: a solid electrolyte (33), a reference electrode (35) coupled

to the solid electrolyte (33) and capable of being exposed to a gas with a known partial pressure of oxygen (column 4, lines 40 – 49); and a working electrode (37) including a mixed ion/electron conductor (column 3, lines 55 – 60), wherein the working electrode is coupled to the solid electrolyte (see Fig. 1). Isenberg ('817) discloses the mixed ion/electron conductor includes perovskite-type oxides (column 3, lines 55 – 60). However, Isenberg ('817) does not expressly the mixed ion/electron conductor including ceria-containing fluorite group of materials.

Ruka ('304) teaches a solid state device (see fig. 1) comprising: a solid electrolyte (13); a reference electrode (14) coupled to the solid electrolyte (see fig. 1 and column 2, line 66 – column 3, line 1); and a working electrode (10) including a mixed ion/electron conductor chosen from the ceria-containing fluorite group of materials (column 3, lines 44 – 60, column 3, lines 6 – 17, column 4, lines 44 – 59), wherein the working electrode is coupled to the solid electrolyte (see fig. 1 and column 2, line 66 – column 3, line 1).

It would have been obvious to one of ordinary skill in the art to have modified the solid state device of Isenberg ('817) to include a ceria-containing fluorite group of material for the working electrode as taught by Ruka ('304) because Ruka ('304) explains that doped ceria provides the electrode with improved sulfur resistance (column 1, lines 16 – 37). The teachings of Ruka ('304) are considered analogous art and relied upon because Ruka ('304) addresses the need for improved sulfur tolerant electrochemical cells (see fig. 3, column 1, lines 32 – 37 and column 6, lines 41 – 58), which is pertinent to applicant's invention.

Regarding claim 24, Isenberg ('817) discloses the solid electrolyte (33) is selected from the group consisting of zirconia and ceria (column 3, lines 39 – 42).

Regarding claim 25, Isenberg ('817) discloses the reference electrode (35) is constructed from the group consisting of platinum, a metal oxide electrode, and a mixed conducting electrode (column 3, line 46 – 51).

Regarding claim 26, because of the phrase "group consisting of platinum, a metal oxide electrode, and a mixed conducting electrode" recited in parent claim 25, and the disclosure of platinum in column 3, lines 46 – 51 of Isenberg ('817), claim 26 is anticipated regardless of any disclosure concerning perovskite.

Regarding claim 27, because of the phrase "group consisting of platinum, a metal oxide electrode, and a mixed conducting electrode" recited in parent claim 25, and the disclosure of platinum in column 3, lines 46 – 51 of Isenberg ('817), claim 27 is anticipated regardless of any disclosure concerning fluorite.

Regarding claim 28, Isenberg ('817) does not explicitly disclose the working electrode (37) is constructed from ceria or its solid solution doped with at least one mixed valency element.

Ruka ('304) teaches a working electrode (10) is constructed from ceria or its solid solution (column 4, lines 44 – 49) doped with at least one mixed valency element (column 4, lines 49 – 59).

Regarding claim 29, Ruka ('304) teaches the mixed valency element is one of terbium and praseodymium (column 4, lines 55 – 56).

Response to Arguments

13. Applicant's arguments filed 13 August 2007 have been fully considered but they are not persuasive. Regarding claim 1, applicant argues on page 7 of the remarks section that the first and second protective covers of Dalla Betta ('828) "simply do not separate the sensor elements from the exhaust stream". However, fig. 1 of Dalla Betta ('828) clearly shows the RTDs (114, 124) are attached to their respective covers (110, 122) which separate them from the exhaust stream and also see baffle/shield (118) that lessens the amount of heat radiated away from one RTD to the other or to surrounding portions of the sensor (column 4, lines 33 – 38 and column 7, lines 10 – 13). Insertion of a sensor element assembly (626) into a block (616) as seen in fig. 6 does not change the structure of the RTDs and protective covers depicted in fig. 1 (see column 12, lines 1 – 15). In response to applicant's argument that the examiner's conclusion of obviousness in combining the teachings of McQueen ('385) with Sheridan ('328) in view of Dalla Betta ('828) is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Regarding independent claim 23, applicant argues that neither Isenberg ('817) nor Ruka ('304) teach or suggest coupling a reference electrode to a gas with a known partial pressure of oxygen. However, no step of coupling a reference electrode to a gas with a known partial pressure of oxygen is required by the claim. In fact, claim 23 isn't a method claim at all, but is directed to a device. Gas is not part of the claimed structure. Knowledge concerning the concentration of oxygen gas is not part of the claimed structure. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham,* 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). "[T]he manner or method in which such machine is to be utilized is not germane to the issue of patentability of the machine itself." *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967). "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining the patentability of the apparatus claim". *Ex parte Thibault* 164 USPQ 666, 667 (Bd. App. 1969). "Inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims" *In re Otto,* 136 USPQ 458, 459 (CCPA 1963).

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Surekha Vathyam whose telephone number is 571-272-2682. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SV/
22 August 2007

NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700